Techniques for Determining the Availability of Food Items to Seaducks Wintering on the Chesapeake Bay, Maryland

David M. Kidwell and Matthew C. Perry
USGS-Patuxent Wildlife Research Center
12100 Beech Forest Road, Laurel, MD 20708, USA

Introduction: Historically, the Chesapeake Bay has been a major wintering area for seaducks. Based on aerial surveys, three species of seaducks, surf scoters (*Melanitta perspicillata*), black scoters (*Melanitta nigra*), and long-tailed ducks (*Clangula hyemalis*), have shown major declines in recent years. One possible explanation for this decline is a reduction of available food items. Preliminary data obtained through satellite telemetry (Table 1) combined with field observations indicate that surf scoters feed at depths ranging from 7 to 39 feet and black scoters from 7 to 46 feet in the mesohaline region of the Chesapeake Bay. Although no data is available for long-tailed ducks, field observations indicate similar preferences. These deep water areas are usually the first to be effected by low oxygen conditions, which may be a factor influencing the quantity and types of food items available to seaducks.

Objectives:

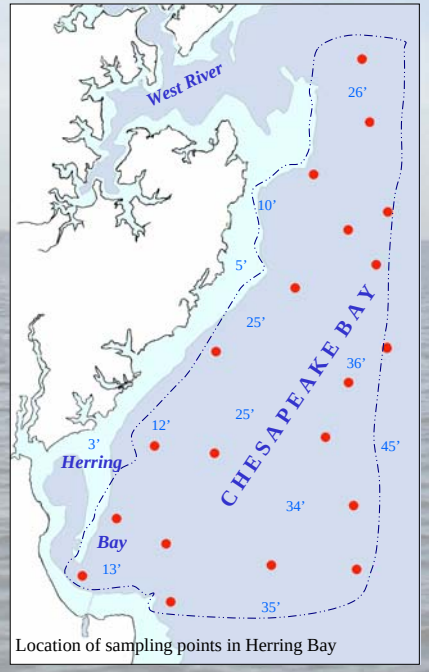
1. Describe the macrobenthic organisms present at seaduck feeding sites in the mesohaline regions of the Chesapeake Bay.
2. Correlate available food items with known food habits of seaducks
3. Describe the sediment characteristics, salinity, and dissolved oxygen content at seaduck feeding habitats.
4. Correlate the available food items with the numbers of seaducks

Sample of hooked mussel and barnacle taken from Herring Bay in 12' of water

Mesh sieve containing a sample before rinsing

Species	Sex	Number	Depth (ft) Median (Range)	Distance from Shore (nm) Median (Range)
Surf Scoter	M	25	16 (7 – 39)	1.47 (.17 – 6.8)
Black Scoter	M	11	19.5 (7 – 46)	1.8 (.17 – 3.6)

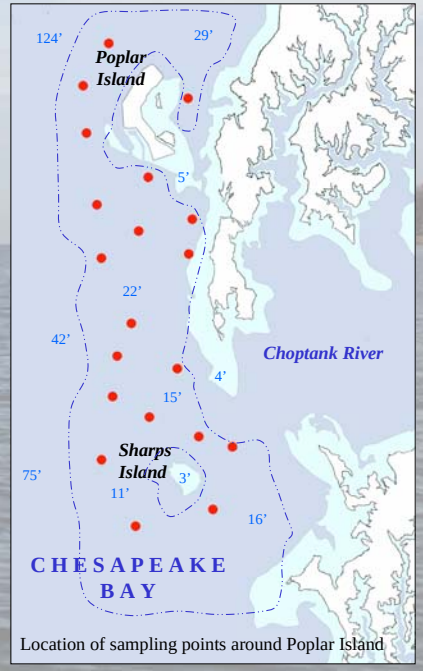
Table 1. Depth and distance from shore of wintering surf and black scoters on the Chesapeake Bay as determined by satellite telemetry.



Location of sampling points in Herring Bay

Peterson Dredge used for sampling

Kidwell and Perry taking benthic samples



Location of sampling points around Poplar Island

Methods: Two study sites were chosen from areas known for traditionally large seaduck populations (Herring Bay and Poplar Island), Twenty sample points were randomly selected at each location using Geographic Information Systems (GIS) in water 10 to 40 feet deep (indicated by dashed line on maps). Coordinates of each point are programmed into a GPS unit to facilitate the location of each point. At each sampling point, macrobenthic invertebrates are collected using 3 grabs from a Peterson dredge with a 0.052 m^2 surface area. Material sampled is rinsed through a 0.5 mm sieve and collected for analysis. All non-organic material is discarded and only intact, viable organisms are used; shells and other remnants are not counted for benthic samples. Benthic samples from each sampling point are then identified and separated by species. Bivalve species are measured along the anterior-posterior axis and separated into 5 mm size classes. Each size class are then measured volumetrically and the number of individuals within each size class are counted. All other species are also measured volumetrically and counted. In addition to invertebrate sampling, sediment characteristics, dissolved oxygen, and salinity are determined at each point.

Boat surveys are conducted at each location to determine the numbers of seaducks. A single transect is completed through each point, beginning the count 1 kilometer prior and ending the count 1 kilometer after the point, giving a 2 kilometer transect. The species of all seaducks observed are recorded by a pair of primary observers positioned at the bow of the boat. To reduce the disturbance on the ducks, all counts are completed at a constant speed of 30 kph. An independent observer is positioned at the center of the boat to monitor the position of flying ducks to minimize the chance of duplicate counting.

Benthic sampling began in winter 2004 and will continue through spring 2006. Samples will be taken 5 times per year, late September, November, February, April, and July. Each month will be analyzed against each other to determine the effects of predation, low-oxygen conditions if present, and recolonization at each site. Statistical correlation techniques will be carried out to determine if there is a link between the benthic organisms sampled and duck density found at each site.

Preliminary results have shown that concentrations of seaducks are associated with areas with hard substrate, with hooked mussel (*Ischadium recurvum*) as the dominant benthic species. Results of this study will be used to assist in the management of seaduck populations and habitat.